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Clinical Case

Beckwith-Wiedemann Syndrome and Dental Features: a Case Report

Síndrome de Beckwith-Wiedemann e características dentárias: relato de caso

Síndrome de Beckwith-Wiedemann y Características Dentales: Reporte de Caso

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Abstract
Beckwith-Wiedemann Syndrome (BWS) is characterized by a disorder on chromosome 11p15, whose loci have growth-regulating genes. Among the numerous clinical features such anterior abdominal wall defects, omphalocele and genital abnormalities, the most prevalent is macroglossia, which can lead to disturbances in craniofacial growth. This report brings a case of a 9-year-old male child with the syndrome treated at the School of Dentistry, State University of Western Paraná, Brazil. It was suggested that observed dental abnormalities, along with the commonly features described in the literature, may be a part of the broad spectrum of the syndrome.
Descriptors: Beckwith-Wiedemann Syndrome; Macroglossia; Genes.
Resumo
A Síndrome de Beckwith-Wiedemann (BWS) é caracterizada por um distúrbio no cromossomo 11p15, cujos loci possuem genes reguladores do crescimento. Dentre as inúmeras manifestações clínicas, como defeitos da parede abdominal anterior, onfalocele e anormalidades genitais, a mais prevalente é a macroglossia, que pode levar a distúrbios no crescimento craniofacial. Este relato traz o caso de uma criança do sexo masculino de 9 anos de idade com a síndrome atendida na Faculdade de Odontologia da Universidade Estadual do Oeste do Paraná, Brasil. Foi sugerido que as anormalidades dentárias observadas, juntamente com as características comumente descritas na literatura, podem fazer parte do amplo espectro da syndrome.
Descritores: Síndrome de Beckwith-Wiedmann; Macroglossia; Genes.
Resumen
El Síndrome de Beckwith-Wiedemann (BWS) se caracteriza por un trastorno en el cromosoma 11p15, cuyos loci tienen genes reguladores del crecimiento. Entre las numerosas características clínicas, como los defectos de la pared abdominal anterior, el onfalocele y las anomalías genitales, la más prevalente es la macroglosia, que puede provocar alteraciones en el crecimiento craneofacial. Este informe trae un caso de un niño de 9 años con el síndrome tratado en la Facultad de Odontología de la Universidad del Estado de Paraná Occidental, Brasil. Se sugirió que las anomalías dentales observadas, junto con las características comunes descritas en la literatura, pueden ser parte del amplio espectro del síndrome.
Descriptores: Síndrome de Beckwith-Wiedmann; Macroglossia; Genes.

INTRODUCTION

Beckwith-Wiedemann Syndrome (BWS), first described in 1963 by Beckwith and later by Wiedmann[1], affects 1:10,000 live births and presents variable clinical expression. It is determined by an abnormality on chromosome 11p15, whose genes regulate fetal growth[2,3]. This chromosome contains genes, such as cell cycle inhibitor gene $CDKN_1C$ and insulin-like growth factor 2 (IGF_2), which are regulators of fetal growth[3]. Genetic alterations such as duplication, deletion, translocation, inversion, and mutation in imprinted regions have been shown to cause BWS[4]. The most frequent defect is DNA methylation abnormalities[3]. Others diseases in addition to BWS have been reported to have molecular alterations at chromosome 11p15. These include isolated hemihyperplasia, Russell-Silver syndrome, and transient neonatal diabetes mellitus, but these molecular alterations and their phenotypic effects on growth are discussed[4].

The abnormalities of chromosome lead to a range of clinical phenotypes[3]. Among variable clinical manifestations, macroglossia, anterior abdominal wall defects, omphalocele,

genital abnormalities, macrosomia, visceromegaly (nephromegaly and/or hepatomegaly), pre and postnatal overgrowth, increased risk of embryonal tumors and neonatal hypoglycemia are the main encountered[1,3,5-7]. On the face, mild microcephaly, frontal capillary hemangioma, abnormal creases in the ear lobes, exophthalmia, enlarged nasal dorsum with planar alar cartilage, occipital prominence, maxillary hypoplasia, shallow orbital floor, hypoplasia of the middle third of face[1] and facial nevi[8] are the principal features observed. BWS has classically been characterized by macroglossia, macrosomia, abdominal wall defects and an increased risk of embryonal tumours, but there is growing recognition that not all patients with BWS display all of these phenotypic features and that patients have remained undiagnosed because they did not present with one of these features, such as macrosomia, which was initially considered as a cardinal feature but is present in only onehalf of the patients[3].

The diagnosis is essentially clinical and can be confirmed by molecular analysis and its precocity is related with improvement of patients' quality of life, minimizing or even so avoiding complications[3,5], specially those associated with malignant tumors (potentially fatal or requiring organ transplantation)[9], dental malocclusion development and joint and speech disorders[10].

Here the authors report clinical dental findings of a child with BWS, aiming to contribute to a better understanding of it, emphasizing the importance of the dental surgeon in the treatment.

CLINICAL CASE

A 9-year-old male patient was taken to the Pediatric Clinic of School of Dentistry, from State University of Western Paraná, Brazil for treatment.

During the anamnesis, his mother reported he was diagnosed with BWS at birth based only by clinical features. He was born at 8 months weighing 1,900 kg, presenting omphalocele and cryptorchidism, surgically corrected at birth and at 2 years old, respectively. The occurrence of anemia, nephrolithiasis and heart murmur (under periodically medical monitoring) were also mentioned, as well the speech-language therapy aiming a better diction and tongue positioning.

Some syndrome features were observed during the extra-oral examination as enlarged nasal dorsum, hypertelorism, hypoplasia of the middle third of the face and facial nevi (Figures 1-3). Additionally, were found intra-orally: mixed dentition, class II occlusion, anterior open bite, hypertrophy of tonsils (referred to tonsillectomy) and tongue protrusion but with no macroglossia (Figures 4-6).

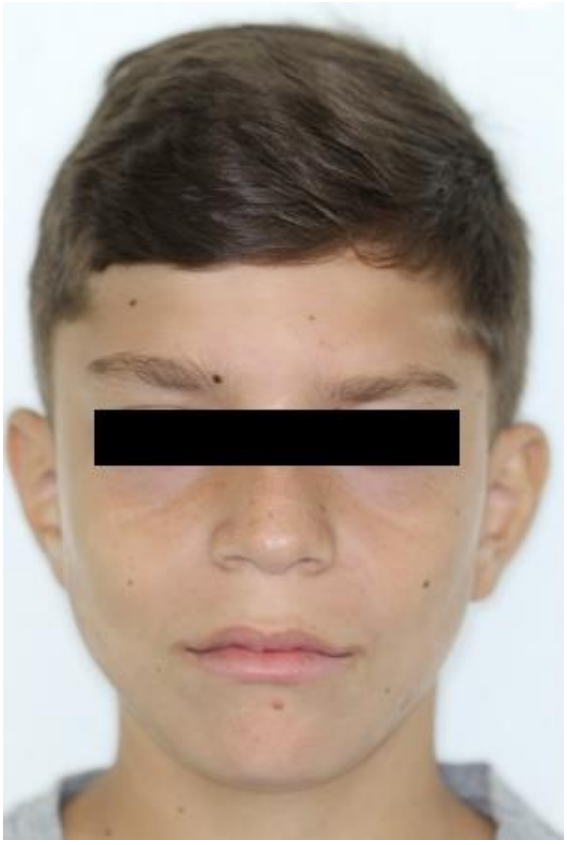

Figure 1: Frontal extraoral photograph.

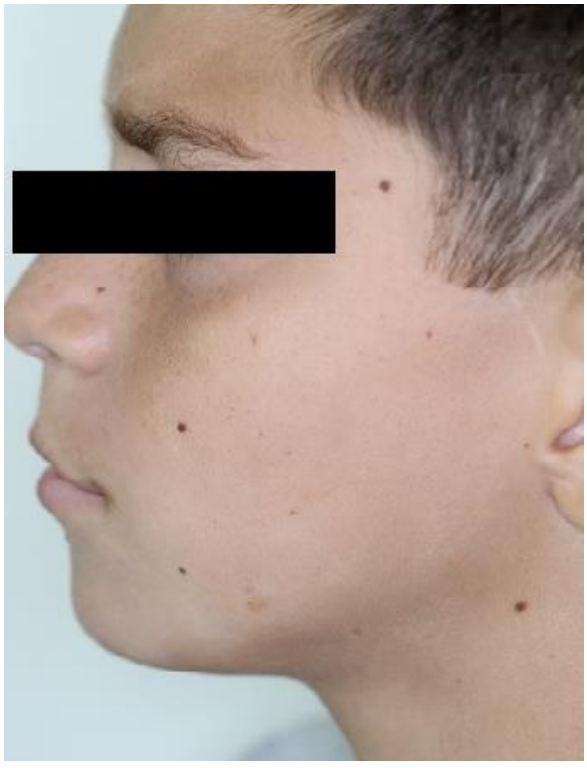

Figure 2: Lateral extraoral photograph.

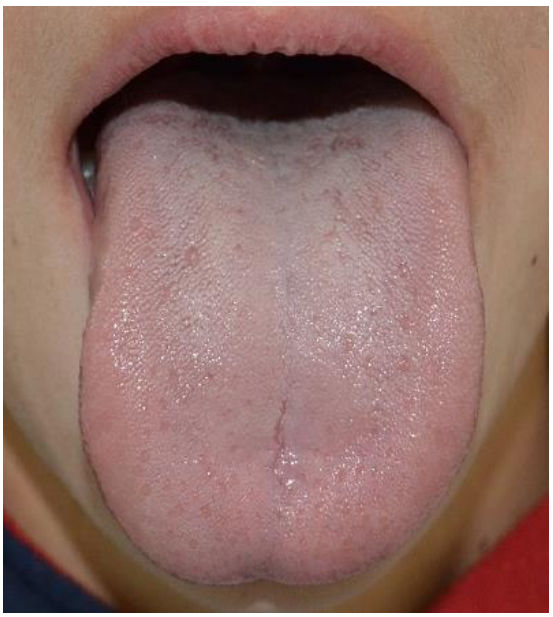

Figure 3: Tongue photograph.

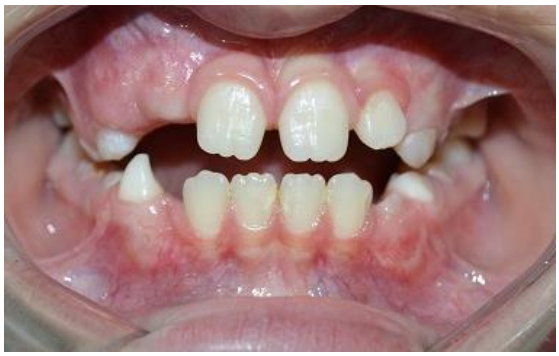

Figure 4: Frontal intraoral photograph.

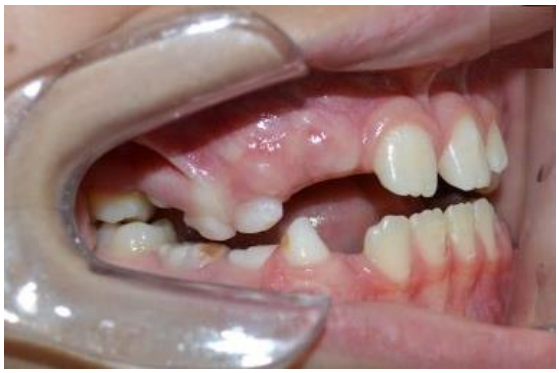

Figure 5: Lateral intraoral photograph.

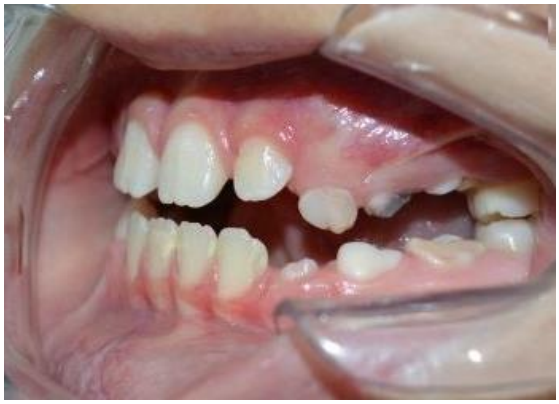

Figure 6: Lateral intraoral photograph.

Calculus (on the lower incisors lingual surfaces), caries lesions (teeth 75, 84 and 85) and extensive amalgam restorations (teeth 55 and 64) observed were schedule to be treated (Figures 7 and 8).

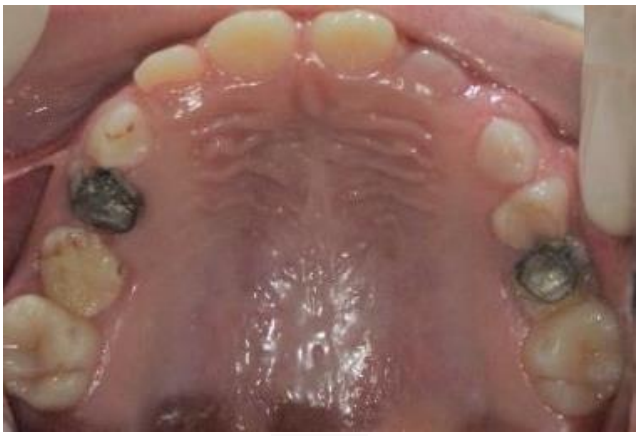

Figure 7: Upper arch photograph.

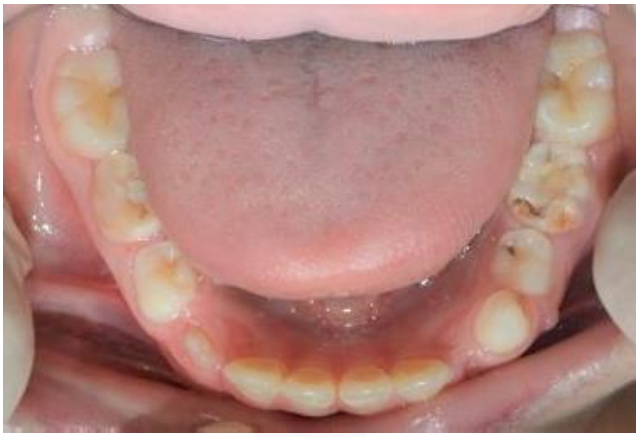

Figure 8: Lower arch photograph.

Radiographic and computed tomography exams showed right condylar hypoplasia, dental ankylosis (55, 65, 75, 84 and 85), extended retention of the 83 element, as well supernumerary tooth (distally to 12, hampering eruption of 13) – all those referred to surgical removal (Figure 9).

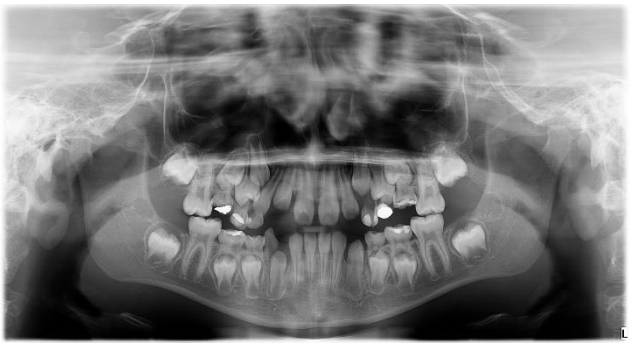

Figure 9: Panoramic radiographic.

DISCUSSION

This patient has the manifestations of BWS as cryptorchidism, omphalocele, nevi, hypertelorism and hypoplasia of the face middle

third. Besides that, the patient has others characterizes in face and teeth, like condylar hypoplasia, supernumerary tooth and ankylosis dental.

The two main clinical manifestations, as cryptorchidism and omphalocele are serious developmental anomalies that require surgical correction, were present, which could facilitate the initial clinical diagnosis[1,5]. Two retrospective studies, evaluating 74 and 14 children with BWS respectively, reported 80% of abdominal wall defect and 80% of abnormalities such as cryptorchidism and/or hypospadias[6,8].

Despite the absence of macroglossia, the speech-language therapy reported, suggested it could have been present in early childhood, later reduced by the slowdown of tongue growth, together with the mandibular growth increase. We emphasize too even though the macroglossia may formerly be considered a cardinal manifestation, recently the literature suggest this complication affect only half of the patient[3]. We highlight however, that condition demands an accurate and immediate diagnosis to minimize possible resulted orthodontic problems (jaw protrusion, mandibular arch length increase, anterior open bite, dental arch widening, facial height increase, pre-leveraged and proclined anterior teeth)[10-12].

Moreover, several nevi were observed on patient`s face (reported in 62% of patients with BWS)[8] as well enlarged nasal dorsum, hypertelorism, hypoplasia of the face middle third and condylar hypoplasia. The absence of acquired alterations (due to trauma, infection, radiation, endocrine disorders, degenerative joint disease or systemic arthropathy) suggests condylar hypoplasia to be congenital and connected to the syndrome, since problems (duplication, deletion, translocation, inversion, and mutation) on 11p15 chromosome can alter the patient's growth[2,3]. Other genetic abnormalities (congenital facial microsomia, micrognathia, syndromes such Treacher Collins, Crouzon and Pierre Robin, cleft of lip and palate) may also affect early tissue differentiation and developmental processes, impairing the posterior region growth pattern[13].

The authors raise a possible relationship between facial alterations and neural crest cells based on itself function: i) it gives rise to most craniofacial bones, cartilage and connective tissues and, ii) development defects affecting these cells represent one third of all head and face congenital disorders[14].

Likewise, the exploration of dental findings and its consequences are decisive. Although dentistry articles about the syndrome approach, at most part, macroglossia related questions and its complications[5,10,11], there is no report of supernumerary tooth (more frequent in male and tooth in the anterior maxilla region permanent dentition)[15-18] as well ankylosis and extended tooth retention so far.

Interestingly, based on a recent systematic review that showed the greater vulnerability of lateral incisors to anomaly, we hypothesize that supernumerary tooth may be related to the syndrome. It was explained the lateral incisors has a double embryological origin (at the fusion between the medial nasal process and the maxillary process) which involves cellular populations of these regions[19]. In addition, it is reinforced by the regulating chromosome 11p15 genes (divided into two domains): the IGF2 and H19 imprinted genes of domain 1 share a set of mesodermal and endodermal enhancers that may affect the formation of dental tissue[4].

The same could be suggested for dental ankylosis and extended retention of molars and the right lower canine given the ectomesenchymal origin of cementum and periodontal ligament. From the clinical point of view, a possible no-spontaneous exfoliate of those teeth demands an urgent diagnosis. If necessary, they to be indicated for exodontia to prevent problems on the permanent successor eruption together with future orthodontic complications[20].

The health professionals involved in the SBW´s treatment should thorough investigate clinical, radiographic, and other diagnostic methods (if necessary) to widely disseminate the associated dental aspects to the overall community. Lastly, we reinforce that dentistry for babies can be of paramount importance to that early and strict extra and intraoral diagnosis and follow-up of BWS manifestations, allowing to intercept and minimize complications resulting from problems in craniofacial development and growth[10-12]. We emphasize this patient has a clinical diagnostic, so we do not know what is the specifically alteration in chromosome affect this case.

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CONFLICTS OF INTERESTS

The authors declare no conflicts of interests.

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